Table 2-2
GENERAL RESPONSE ACTIONS
FOR SURFACE WATER [a]
With Initial Screening of Technologies and Process Options

General Response Action	Remedial Technology	Process Option	Description of Process Option	Applicability/ Reason for Elimination
No Action	None	None	No action would be taken and operation of the existing water treatment plant (WTP) would cease, including collection of contaminated seep water. The contaminated area remains in its existing condition.	Required for consideration by NCP.
No Further Action	None	None	No new action would be taken, however the existing WTP would continue to operate without significant upgrades or repairs.	Retained for further consideration.
Institutional Controls	Land Use Controls	Deed/Zoning Restrictions	Restrict surface water use through legally binding requirements on property such as deed and zoning restrictions. Restrictions would be used to prevent use or transfer of property without notification of limitations on the use of the property.	Retained for further consideration.
	Access Restrictions	Physical Restrictions (Fencing and Posted Warnings)	Fences, berms, and warning signs would be used to control access to areas with contaminated surface water.	Retained for further consideration.
	Community Awareness	Information and Education Programs	Community information and educational programs would be undertaken to enhance awareness of potential hazards and remedies.	Retained for further consideration.
Monitoring	None	Long-term Surface Water Monitoring	Ongoing monitoring for COCs in surface water.	Retained for further consideration.
		Monitored Natural Attenuation	Concentrations of COCs in surface water would recover through natural in-situ processes such as dilution, biodegradation, adsorption, and chemical reactions. Site modeling would be done to demonstrate that contaminant concentrations would decline.	Retained for further consideration.

GENERAL RESPONSE ACTIONS
FOR SURFACE WATER [a]
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General Response Action	Remedial Technology	Process Option	Description of Process Option	Applicability/ Reason for Elimination
Containment	Surface Water Controls	Grading	Contouring/swales to promote runoff and reduce infiltration of surface water into contaminated material.	Technically feasible and potentially applicable.
		Revegetation	Revegetate surfaces of recontoured land and ditches to reduce erosion and the amount of solids in the runoff.	Technically feasible and potentially applicable.
		Channelization	Surface water flowing through contaminated material in existing ditches would be controlled by installation of constructed channels (lined ditches, riprapped ditches, energy dissipators, etc.)	Technically feasible and potentially applicable.
		Diversion Ditches	Surface water runon would be diverted around and away from contaminated material.	Technically feasible and potentially applicable.
		Relocation	Physically relocate existing surface water drainages around and away from contaminated materials.	Technically feasible and potentially applicable.
		Backfill (Partial or Full)	Open pits would be totally or partially backfilled with clean materials to reduce exposure. Fill materials may be from on-site borrow sources.	Technically feasible and potentially applicable to Pit 3 and Pit 4.
		Bio-Engineering	Stream stabilization would be performed using rocks, wood debris and other materials to reduce erosion and the amount of solids in the runoff.	Technically feasible and potentially applicable.
		Sedimentation Dams/Traps	Sedimentation dams and traps would be constructed to capture and contain solids in the runoff to control downstream transport.	Technically feasible and potentially applicable.
		Passive Collection	Passive collection of seeps in ponds with routing to a water treatment plant.	Technically feasible and potentially applicable.
	Physical Barriers	Hydraulic Isolation	Line drainages to reduce surface water contact with contaminated groundwater and sediment.	Technically feasible and potentially applicable.

GENERAL RESPONSE ACTIONS
FOR SURFACE WATER [a]
With Initial Screening of Technologies and Process Options

General Response Action	Remedial Technology	Process Option	Description of Process Option	Applicability/ Reason for Elimination
Removal	Dewatering	Complete Dewatering	Ongoing remove of contaminated surface water from pits, ponds, and/or drainages.	Technically feasible and potentially applicable.
		Partial Dewatering	Actively extract water to maintain water level at or near pit bottom.	Technically feasible for the pits.
		Gravity Drain	Surface water in the pits would be limited to a specific elevation using a gravity drain (surface or subsurface) and routed to a treatment plant for processing, as needed.	Technically feasible and potentially.
Treatment	Continue Operating Existing WTP [b]	Chemical Precipitation	Active water treatment continues using the existing water treatment plant without modification. Sludge generated during treatment would continue to be disposed off-site at the Ford Mill until closure or at a new disposal site.	Technically feasible and potentially applicable.
	Ex-Situ Physical/Chemical [b]	See GRAs for groundwater (Table 2-4)		
	In-Situ Physical/Chemical	Aeration/Air Stripping	Injection of air into the surface water forming bubbles that transfer dissolved contaminants into the air phase.	Not Retained. Proven method to remove radon from water, but ineffective at removing parent radionuclides.
		Bacterial Reduction	Introduction of bacteria to promote the immobilization of metals by creating reducing conditions.	Technically feasible and potentially applicable. Innovative technology requiring treatability testing.
		Neutralization/ Precipitation	Adjustment of surface water pH. Soluble metal salts are converted to insoluble salts that will precipitate. Typically performed with liming agents like limestone or hydrated lime, but the use of other alkalis is technically feasible.	Technically feasible and potentially applicable. Effective method for metals and radionuclides.
		Reactive Bags	Bags of reactive material would be placed in the surface water so that flow past the reactive materials reduces COC concentrations.	Technically feasible and potentially applicable. Innovative technology requiring treatability testing.

GENERAL RESPONSE ACTIONS
FOR SURFACE WATER [a]
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General Response Action	Remedial Technology	Process Option	Description of Process Option	Applicability/ Reason for Elimination
Treatment (continued)	In-Situ Physical/Chemical (continued)	Passive Reactive Barrier	Contaminated surface water would be funneled through chemically or biologically active materials to reduce concentrations of COCs.	Technically feasible and potentially applicable. Innovative technology requiring treatability testing.
	Biological	Constructed Wetlands	Wetlands or marshes would be constructed to create aerobic and anaerobic environments to remove dissolved metals and reduce suspended solids in water to control downstream transport.	Technically feasible and potentially applicable. May not have adequate area with level grade for high flowrates.
		Biological Oxidation and Reduction	Addition of organic matter to water to precipitate some metals.	Technically feasible and potentially applicable. Not effective for pH adjustment.
Disposal of Surface Water	On-Site Disposal of Treated Water	See GRAs for groundwater (Table 2-4)		
	Off-Site Disposal	See GRAs for groundwater (Table 2-4)		

GENERAL RESPONSE ACTIONS FOR SURFACE WATER [a] With Initial Screening of Technologies and Process Options

Denotes remedial technology process option that will not be carried forward for additional evaluation.

[a] Surface Water includes seeps, water in open pits, ponded water, and affected drainages.
[b] Residuals produced during ex-situ physical/chemical treatment of water will likely follow one of the off-site disposal process options presented on Table 2-1. Disposal of residuals will depend on the various treatment alternatives selected. In addition, the residuals may go through additional treatment or waste minimization process prior to final disposal.

Notes: 1) Multiple response actions and remedial technologies will be combined to develop alternatives for surface water.

2) Process options retained for additional evaluation may not be applicable to all locations of the site or conditions present at the site.

3) Some technologies presented in this table are applicable to still water, but not flowing water.

4) Based on the NCP, consolidation/containment remedial technologies are preferred for contaminated material with large volumes and low concentration levels. Smaller volumes of material with higher concentrations are more suited for treatment.

5) Remedial technologies requiring treatability testing could be performed during the remedial design phase.